REMARKS

This is in response to the Office Action mailed on February 10, 2005, and the references cited therewith.

Claims 1 and 25 are amended, claims 26-27 are canceled, and no claims are added; as a result, claims 1-25 are now pending in this application.

§112 Rejection of the Claims

Claims 1-25 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Independent claims 1 and 25 are amended to clarify the claims. Claims 2-24 depend, directly or indirectly, from amended independent claim 1 and are clarified by the amendment to claim 1. Applicant respectfully requests reconsideration and withdrawal of the §112 rejection.

In the event that the Final Office Action is maintained, entry of the amendments to claims 1 and 25 is respectfully requested to remove issues for purposes of appeal to the Board of Patent Appeals and Interferences.

§102 Rejection of the Claims

Claims 1-12, 14-20 and 25-27 were rejected under 35 USC § 102(b) as being anticipated by Nishikawa et al. (Nishikawa et al., "A Method for Auto-Tuning of PID Control Parameters", Automatica, vol. 20, no. 3, pp. 321-332, 1984)(hereinafter "Nishikawa").

Applicant has amended claims 1 and 25 to clarify the claims as mentioned above with regard to the § 112 rejections. The subject matter of claims 26 and 27 is now presented in amended claims 1 and 25.

Applicant respectfully traverses this rejection because Nishikawa fails to teach a target loop transfer function and because Nishikawa requires that the Auto-tuner receive a process output signal.

The Office Action asserts that Nishikawa teaches a target loop transfer function as claimed. However, section 4.1 of Nishikawa et al. was cited as providing a target loop transfer function, but instead describes the use of a weighted integral of squared error. This is simply not

a target loop transfer function as claimed and described in the application. Further, as previously argued, the target loop transfer function is not a model of the process, but rather describes the nature of the reaction of the process.

Further, the target loop transfer function of the method in claim 1 allows the gain tuning without reference to the actual the process output. This is apparent in FIG. 1 where process 30 output 14 is provided to the controller 12 and not to the PID Gain Tuner 36. Independent claim 1 reflects this by "the controller receiving a process output signal. . ." and by the "calculating one or more new gains" without reference to actual process output.

Nishikawa, on the other hand, requires a process output signal to tune the process. For example, FIG. 3 on page 324 illustrates the process ($G_p(s)$) output x provided only to the Auto-tuner. The disturbance signal N' is then applied to the control system to sample the closed-loop response to the process. Nishikawa, page 324, § 3.2. Further, the gain signals provided by the Auto-tuner are based on actual process response. Thus, because Nishikawa describes a system where the Auto-tuner receives a process output signal and generates a disturbance signal and gain signals based on an actual process output signal, the Auto-tuner must receive the process output signal x.

Thus, independent claim 1 is not anticipated by Nishikawa because Nishikawa requires that the process output signal x be provided to the Auto-tuner and that gains be determined based on an actual process output signal. Nishikawa further fails to teach a target loop transfer function.

Allowance of claims 1-12, 14-20 and 25 is respectfully requested.

§103 Rejection of the Claims

Claim 13 was rejected under 35 USC § 103(a) as being obvious over Nishikawa in view of Stoddard et al. (US 5,895,596) (hereinafter "Stoddard").

Claim 13 was rejected under 35 USC § 103(a) as being obvious over Nishikawa in view of Grassi (E. Grassi, "Proportional-Integral-Derivative Controller Tuning by Frequency Loop-Shaping," Ph.D. dissertation, Arizona State University, December 1999)(hereinafter "Grassi").

Claims 21-24 were rejected under 35 USC § 103(a) as being obvious over Nishikawa in view of Grassi et al. (Grassi et al., "PID Controller Tuning by Frequencey Loop-Shaping," Proc. 35th Conference on Decision and Control, Japan, December 1996)(hereinafter "Grassi II").

These rejections of claims 13 and 21-24 are all based in part on Nishikawa. The references Stoddard, Grassi, and Grassi et al fail to cure the deficiencies of Nishikawa, namely that Nishikawa fails to teach calculating new gains using the process input control signal which includes the introduced disturbance.

Further, claims 13 and 21-24 depend, directly or indirectly, on patentable independent claim 1. If an independent claim is patentable, then any claim depending therefrom is nonobvious. MPEP § 2143.03

Thus, Applicant respectfully submits that claim 13 and 21-24 are patentable. Allowance of these claims is earnestly requested.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6911 to facilitate prosecution of this application.

In the event that the claims are not allowed in response to this action, please enter the amendment detailed in the marked-up claim set to remove issues for purposes of appeal to the Board of Patent Appeals and Interferences as requested above.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date April 11, 2005

By _____
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 11th day of April, 2005.

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Signature